

Massachusetts Teachers' Retirement System

ACTUARIAL VALUATION REPORT

JANUARY 1, 2006

PUBLIC EMPLOYEE RETIREMENT ADMINISTRATION COMMISSION
COMMONWEALTH OF MASSACHUSETTS



TABLE OF CONTENTS

Section	Page
I. Introduction & Certification	I
2. Executive Summary	
A. Principal Valuation Results	2
B. Comparison with Prior Valuation and Experience Analysis.....	3
C. Funding Progress	6
3. Summary of Valuation Results.....	8
4. Development of the Actuarial Gain or Loss	9
5. Plan Assets	
A. Asset Allocation	10
B. Development of Actuarial Value of Assets	11
6. System Membership	
A. Active Members.....	12
B. Retirees and Survivors.....	15
7. Valuation Cost Methods	
A. Actuarial Cost Method	17
B. Asset Valuation Method	17
8. Actuarial Assumptions	18
9. Summary of Plan Provisions.....	21
10. Glossary of Terms	27

I. INTRODUCTION & CERTIFICATION

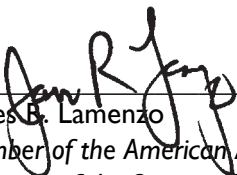
This report presents the results of the actuarial valuation of the Massachusetts Teachers' Retirement System (TRS).

The valuation was performed as of January 1, 2006 pursuant to Chapter 32 of the General Laws of the Commonwealth of Massachusetts and based on the plan provisions at that time. The actuarial assumptions used to calculate the accrued liability and the normal cost are the same as those used in our January 1, 2005 actuarial valuation and reflect the experience analysis we conducted in 2000.

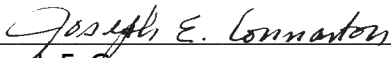
This valuation was based on member data as of December 31, 2005, which was supplied by the Retirement Board. We performed a number of tests on the data and made specific assumptions and determinations for a number of data items. We provide more detail on these issues in Section 6. Asset information as of December 31, 2005 was provided by the Pension Reserves Investment Management Board. Both the membership data and financial information were reviewed for reasonableness but not audited by us.

Although we have some concerns as outlined in Section 6, overall we believe this report represents an accurate appraisal of the actuarial status of the TRS performed in accordance with generally accepted actuarial principles and practices relating to pension plans. In our opinion the actuarial assumptions used in this report are reasonable, are related to plan experience and expectations, and represent our best estimate of anticipated experience.

Respectfully submitted,
Public Employee Retirement Administration Commission



James R. Lamenzo
Member of the American Academy of Actuaries
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Joseph E. Connarton
Executive Director

Dated: October 20, 2006

2. EXECUTIVE SUMMARY

PART A | PRINCIPAL VALUATION RESULTS

Section 22C of G.L., c. 32 mandates the establishment of a funding schedule for the Commonwealth of Massachusetts pension obligation. The Massachusetts Teachers' Retirement System reflects one component of the Commonwealth schedule. The other components are the State Retirement System, liabilities for Boston teachers, and State reimbursements to local systems to reflect COLAs granted from 1982 through 1996. The schedule, as mandated by law, calls for payment of the Normal Cost plus an amortization payment on the Unfunded Actuarial Liability. The law requires amortization payments such that the Unfunded Actuarial Liability is reduced to 0 by June 30, 2023. Under the current schedule, the amortization payments to eliminate the unfunded liability increase by 4.5% per year.

The results of the January 1, 2006 actuarial valuation are as follows (000s omitted):

Total Normal Cost	\$570,013
Expected Employee Contributions	<u>462,110</u>
Net Normal Cost	<u>\$107,903</u>

Total Actuarial Liability	\$27,787,716
Assets	<u>18,683,295</u>
Unfunded Actuarial Liability	<u>\$9,104,421</u>

2. EXECUTIVE SUMMARY *(continued)*

PART B | COMPARISON WITH PRIOR VALUATION AND EXPERIENCE ANALYSIS

A comparison of the current valuation and the January 1, 2005 valuation is shown below.
(\$000's omitted)

	1/1/06	1/1/05	Increase (Decrease)	Increase (Decrease)
Total Normal Cost	\$570,013	\$541,105	\$28,908	5.3%
Expected Employee Contributions	<u>462,110</u>	<u>443,317</u>	<u>18,793</u>	4.2%
Net Normal Cost	<u>\$107,903</u>	<u>\$97,788</u>	<u>\$10,115</u>	10.3%
Actuarial Liability				
Actives	\$14,568,185	\$14,288,848	\$279,337	2.0%
Retirees and Inactives	<u>13,219,531</u>	<u>11,877,827</u>	<u>1,341,704</u>	11.3%
Total	\$27,787,716	\$26,166,675	\$1,621,041	6.2%
Assets	<u>18,683,295</u>	<u>17,683,368</u>	<u>999,927</u>	5.7%
Unfunded Actuarial Liability	<u>\$9,104,421</u>	<u>\$8,483,307</u>	<u>\$621,114</u>	7.3%
Funded Ratio	67.2%	67.6%	(0.4%)	

We completed an Experience Study Analysis of the Massachusetts Teachers' Retirement System in 2000. We are currently performing another analysis for the years 2000-2005 and expect to release our results by early 2007. Any assumption changes resulting from the experience study will be reflected in the January 1, 2007 actuarial valuation.

The development of the actuarial gain/(loss) is shown on page 9. During 2005, there was an overall actuarial loss of \$481 million. There was a non-investment loss on actuarial liability of approximately \$241 million. Most of this loss was due to our revised methodology for estimating credited service discussed in greater detail in Section 6. There was a loss on assets (on an actuarial value basis) of \$240 million. The return on assets was approximately 6.9% on an actuarial value basis, compared to 12.8% on a market value basis. The difference in returns is attributable to the asset smoothing methodology and recognition of losses that were deferred in the prior valuation.

2. EXECUTIVE SUMMARY *(continued)*

PART B | COMPARISON WITH PRIOR VALUATION AND EXPERIENCE ANALYSIS *(continued)*

The development of the actuarial value of assets is shown on page 11. As of January 1, 2006 the calculated actuarial value of assets is 93.4% of the market value. As of January 1, 2005 the calculated actuarial value of assets was 98.3%. Under the corridor approach used in this valuation, the actuarial value of assets cannot be less than 85% nor greater than 115% of the market value.

We have detailed a number of the assumptions we made for missing or questionable data for active members in Section 6. We believe these assumptions provide reasonable valuation results on an overall basis.

2. EXECUTIVE SUMMARY *(continued)*

PART B | COMPARISON WITH PRIOR VALUATION AND EXPERIENCE ANALYSIS *(continued)*

	<u>1/1/06</u>	<u>1/1/05</u>	<u>% Difference</u>
<u>Actives</u>			
Number	88,788	88,027	0.9%
Total Payroll	\$4,819,324,630	\$4,642,764,818	3.8%
Average Salary	\$54,279	\$52,743	2.9%
Average Age	44.6	44.7	(0.2%)
Average Service	13.9	14.2	(2.1%)

	<u>1/1/06</u>	<u>1/1/05</u>	<u>% Difference</u>
<u>Retirees and Survivors</u>			
Number	44,452	42,164	5.4%
Total Benefits	\$1,370,999,700	\$1,230,428,062	11.4%
Average Benefits	\$30,842	\$29,182	5.7%
Average Age	69.8	69.9	(0.1%)

2. EXECUTIVE SUMMARY *(continued)*

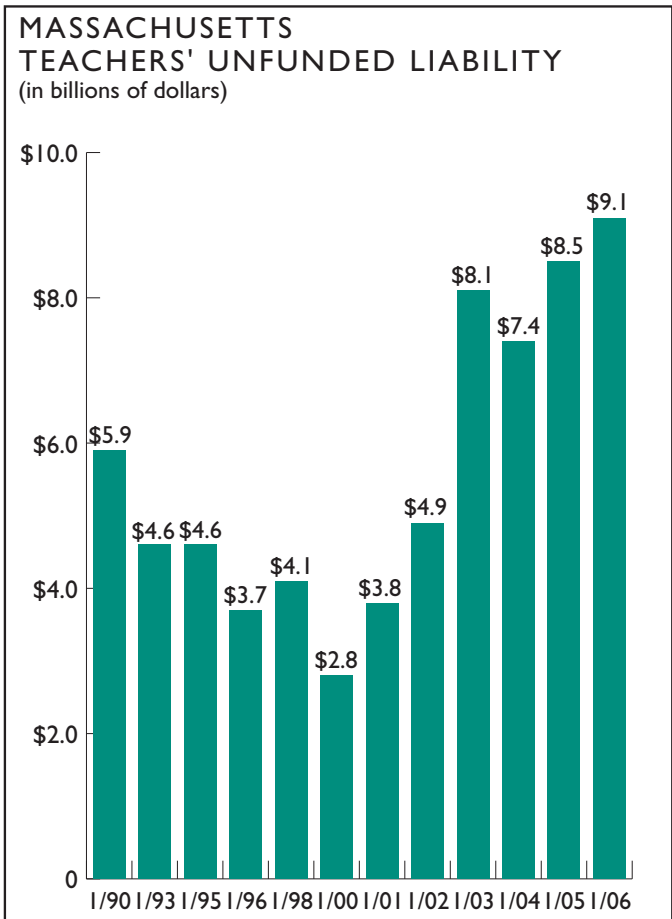
PART C | FUNDING PROGRESS

UNFUNDED LIABILITY

The chart below shows the unfunded actuarial accrued liability (UAL) since 1990. The UAL represents the actuarial accrued liability less the actuarial value of plan assets. When there is no UAL, a system is said to be “fully funded”.

The actuarial value of assets used to derive the UAL from January 1, 1990 to January 1, 1996 reflects the market value of plan assets. To reduce the potential volatility of the market value approach, in the January 1, 1998 actuarial valuation, we began implementing a method that averages realized and unrealized asset gains and losses over 5 years. Therefore, gains and losses in a given year are not fully reflected in the actuarial value of assets until 5 years later.

The chart below indicates the UAL, on an actuarial basis, increased from \$8.5 billion on 1/05 to \$9.1 billion on 1/06. (On a market value basis, the UAL decreased from \$8.2 billion on 1/05 to \$7.8 billion on 1/06.) From 1998 - 2001, the market value of assets exceeded the actuarial value of assets. Consequently, the unfunded liability on an actuarial value basis was greater than the unfunded liability on a market value basis. From 2002 - 2004, the market value of assets was less than the actuarial value of assets and the UAL on an actuarial value basis was less than the UAL on a market value basis. In 2005 and in this valuation, the market value of assets once again exceeds the actuarial value of assets.



2. EXECUTIVE SUMMARY *(continued)*

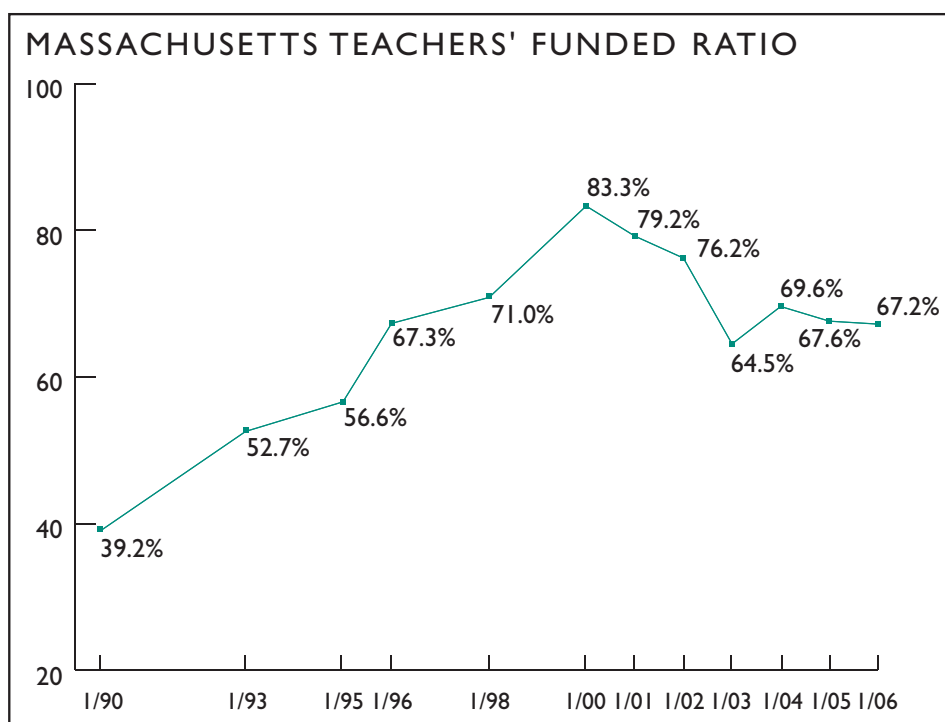
PART C | FUNDING PROGRESS *(continued)*

FUNDED RATIO

The chart below shows the funded ratio progress since 1990. The funded ratio represents the actuarial value of plan assets divided by the actuarial accrued liability. When the funded ratio reaches 100%, a system is said to be “fully funded”.

The actuarial value of assets used to derive the funded ratio from January 1, 1990 to January 1, 1996 reflects the market value of plan assets. To reduce the potential volatility of the market value approach, in the January 1, 1998 actuarial valuation, we began implementing a methodology that averages realized and unrealized asset gains and losses over 5 years. Therefore, gains and losses in a given year are not fully reflected in the actuarial value of assets until 5 years later.

The chart below indicates the funded ratio on an actuarial basis slightly decreased from last year. (On a market value basis the funded ratio increased from 68.6% on 1/05 to 72.0% on 1/06.) From 1998 - 2001, the market value of assets exceeded the actuarial value of assets. Consequently, the funded ratio on an actuarial value basis was less than the funded ratio on a market value basis for those years. From 2002 - 2004, the market value of assets was less than the actuarial value of assets and consequently, the funded ratio on an actuarial basis was greater than the funded ratio on a market value basis. In 2005 and in this valuation, the market value of assets once again exceeds the actuarial value of assets.



3. SUMMARY OF VALUATION RESULTS

(dollars in thousands)

A. Number of Members	
Active	88,788
Vested Terminated	N/A
Retired/ Beneficiaries	<u>44,452</u>
Total	133,240
B. Total Payroll	\$4,819,325
C. Normal Cost	
Superannuation	\$475,329
Death	25,770
Disability	7,781
Termination	<u>61,133</u>
Total Normal Cost	\$570,013
Expected Employee Contributions	<u>462,110</u>
Net Employer Normal Cost	\$107,903
D. Actuarial Liability	
Active	
Superannuation	\$14,056,501
Death	192,262
Disability	73,757
Termination	<u>245,665</u>
Total Active	\$14,568,185
Vested Terminated (a)	400,000
Non-Vested Terminated	N/A
Retirees and Survivors	<u>12,819,531</u>
Total Actuarial Liability	\$27,787,716
E. Actuarial Value of Assets	<u>18,683,295</u>
F. Unfunded Actuarial Liability	\$9,104,421
G. Funded Ratio: E/D	67.2%

(a) estimated and includes non-vested terminated members.

4. DEVELOPMENT OF THE ACTUARIAL GAIN OR LOSS (in millions)

A. Gain/(loss) on Actuarial Liability

1. Actuarial Liability 1/1/2005	26,167
2. Total Normal Cost 1/1/2005	541
3. Interest on (1) and (2) at 8.25%	2,203
4. Benefits paid during 2005 [a]	1,310
5. Interest on (4) assuming mid year payment	54
6. Expected Actuarial Liability 1/1/2006: (1)+(2)+(3)-(4)-(5)	27,547
7. Actuarial Liability 1/1/2006	27,788
8. Gain/(loss): (6)-(7)	(241)

B. Gain/(loss) on assets

9. Actuarial Value of Assets (AVA) 1/1/2005	17,683
10. Interest on (9) at 8.25%	1,459
11. Net Receipts [b]	520
12. Net Disbursements [b]	724
13. Net Cash Flow: (11)-(12)	(204)
14. Interest on (13) [c]	(15)
15. Expected AVA 1/1/2006: (9)+(10)+(13)+(14)	18,923
16. AVA 1/1/2006	18,683
17. Gain/(loss): (16)-(15)	(240)

C. Total Gain/(loss): (8)+(17)	(481)
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Totals may not add exactly due to rounding.

[a] Estimated

[b] Amounts actually received or disbursed by the fund.

[c] Assumes time weighting based on the monthly cash flow.

5. ASSETS

All figures are shown in thousands.

PART A | ASSET ALLOCATION

Investment in the Pension Reserves	
Investment Trust	
Market value	\$20,013,412
Actuarial value	\$18,683,295
Actuarial value as a percentage of market value	93.4%

5. ASSETS *(continued)*

PART B | DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS (in thousands)

A. Development of 12/31/05 expected actuarial value of assets (AVA)

1. Market Value (MV) 12/31/04	17,946,339
2. Actuarial Value 12/31/04 (as calculated)	17,683,368
3. Net Receipts 2005	520,300
4. Net Disbursements 2005	723,800
5. Net Cash Flow: (3)-(4)	(203,500)
6. Expected Investment Return on (2): $0.0825 \times (2)$	1,458,878
7. Expected Investment Return on (5): $\frac{1}{2} \times 0.0825 \times (5)$	(8,394)
8. Expected AVA 12/31/05: (2)+(5)+(6)+(7)	18,930,351

B. Previous differences not yet amortized

1. Unrecognized amount of 12/31/04 difference	
a. $.2 \times 2001$ Gain/(loss)	(401,304)
b. $.4 \times 2002$ Gain/(loss)	(1,082,704)
c. $.6 \times 2003$ Gain/(loss)	1,138,045
d. $.8 \times 2004$ Gain/(loss)	<u>608,934</u>
e. Total	262,971

C. Gain/(loss) from 2005

1. Market Value 12/31/05	20,013,412
2. Expected Market Value 12/31/05: A(8)+B(1e)	19,193,322
3. Gain/ (loss) from 2005 investment: (1)-(2)	820,090

D. Development of AVA 12/31/05

1. 2005 Gain/(loss)	820,090
2. 2004 Gain/(loss)	761,168
3. 2003 Gain/(loss)	1,896,741
4. 2002 Gain/(loss)	(2,706,761)
5. 2001 Gain/(loss)	(2,006,520)
6. 20% of 2005 Gain/(loss)	164,018
7. 20% of 2004 Gain/(loss)	152,234
8. 20% of 2003 Gain/(loss)	379,348
9. 20% of 2002 Gain/(loss)	(541,352)
10. 20% of 2001 Gain/(loss)	<u>(401,304)</u>
11. Total	(247,056)
12. Actuarial Value 12/31/05: A8+D11	18,683,295
13. Percentage of Market Value	93.4%

6. SYSTEM MEMBERSHIP

A critical element of an actuarial valuation is accurate and up-to-date membership information. As part of this valuation PERAC analyzed the member data provided by the Massachusetts Teachers' Retirement System (TRS).

PART A | ACTIVE MEMBERS

For a number of years, we have estimated the total creditable service for each member for the actuarial valuation. The estimate was based on either the employment date (date of hire as a teacher) or the adjusted employment date and was set equal to the greater of the two calculated service amounts. We used this methodology, which we believed was conservative, because we had no way to assess additional costs for members who buy back service near retirement. Earlier this year, with the help of the TRS, we compared the service estimated for valuation purposes with actual service for over 6,800 members who retired in 2004 and 2005. We found that, in total, our methodology slightly understated service. To better reflect this cost, we adjusted our normal cost and liability figures as of January 1, 2006. We used a 1% loading factor based on our analysis.

For members with a date of birth and/or date of hire that seemed questionable, we assumed (based on credited service or date of birth) the member was hired at age 30 (or at a younger age, if the member was under 30).

In past valuations, TRS expressed more confidence in the accuracy of the annuity savings fund (ASF) contributions than the salary data provided to us. Therefore, we estimated salaries based on the employee contribution rate and the ASF contributions. An improved methodology was developed to provide salary data to us this year. However, the reported salary in the original data provided to us was overstated for members who had a reported date in 2005 in the "status date" field. The salary data provided this year was generally accurate (reported salary reconciled with estimated salary based on ASF contributions and employee contribution rate) with the status date exception. We estimated salaries as in past years for members with a reported status date in 2005.

Based on our experience with prior years' data and buyback issues, we made several adjustments. Members whose pay was less than \$5,000 were assumed to be inactive. For members with pay between \$5,000 and \$10,000, we used an estimated pay of \$20,000. For members with calculated pay over \$150,000, we compared this year's figure to the pay used in last year's valuation. We adjusted this year's figure if we believed it was overstated.

Pay for all members hired in 2005 was annualized. We assumed a rate of pay of \$50,000 for members hired after October 1.

Because we could not determine the number of vested terminations, we estimated a combined inactive (terminated vested plus terminated with an ASF balance) liability. This is the same methodology we used in prior years.

6. SYSTEM MEMBERSHIP *(continued)*

PART A | ACTIVE MEMBERS *(continued)*

	Actives
Number of Members	88,788
Average Age	44.6
Average Service	13.9
Average Salary	\$54,279
Average Annuity Savings Fund Balance	\$46,491

Age by Service Distribution of Active Members

Present Age	Years of Service							Total
	0 – 4	5 -9	10 - 14	15 – 19	20 – 24	25 - 29	30+	
0 - 24	2,618	3						2,621
25 - 29	8,341	1,736	5					10,082
30 - 34	4,340	5,195	1,307	3				10,845
35 - 39	2,719	3,171	3,308	474	1			9,673
40 - 44	2,494	2,063	1,754	1,981	464	2		8,758
45 - 49	2,264	2,291	1,650	1,660	1,791	885	1	10,542
50 - 54	1,690	2,093	1,894	1,687	1,375	4,083	3,134	15,956
55 - 59	964	1,098	1,223	1,504	962	1,472	8,517	15,740
60 - 64	231	326	326	454	331	344	1,926	3,938
65+	44	51	56	80	53	64	285	633
Total	25,705	18,027	11,523	7,843	4,977	6,850	13,863	88,788

6. SYSTEM MEMBERSHIP *(continued)*

PART A | ACTIVE MEMBERS *(continued)*

Salary by Age Distribution of Active Members

Present Age	Number of Members	Total Salary	Average Salary
0 - 24	2,621	\$103,574,537	\$39,517
25 - 29	10,082	\$414,185,500	\$41,082
30 - 34	10,845	\$501,787,217	\$46,269
35 - 39	9,673	\$490,854,238	\$50,745
40 - 44	8,758	\$462,057,872	\$52,758
45 - 49	10,542	\$577,521,855	\$54,783
50 - 54	15,956	\$957,054,300	\$59,981
55 - 59	15,740	\$1,017,283,688	\$64,630
60 - 64	3,938	\$254,680,400	\$64,673
65+	633	\$40,325,023	\$63,705
Total	88,788	\$4,819,324,630	\$54,279

6. SYSTEM MEMBERSHIP *(continued)*

PART B | RETIREES AND SURVIVORS

	Superannuation	Ordinary Disability	Accidental Disability	Survivors	Total
Number of Members	40,393	458	298	3,303	44,452
Average Age	69.9	66.3	67.0	70.0	69.8
Average Annual Benefit	\$32,364	\$17,408	\$30,536	\$14,120	\$30,842

Benefit by Retirement Type

	Superannuation	Ordinary Disability	Accidental Disability	Survivors	Total
Annuity	\$162,516,675	\$514,583	\$268,726	\$2,655,118	\$165,955,102
Pension	\$1,144,773,789	\$7,458,074	\$8,831,003	\$43,981,732	\$1,205,044,598
Total	\$1,307,290,464	\$7,972,657	\$9,099,729	\$46,636,850	\$1,370,999,700

6. SYSTEM MEMBERSHIP *(continued)*

PART B | RETIREES & SURVIVORS *(continued)*

Benefit by Age Distribution

Present Age	Number of Members	Total Benefits	Average Benefits
Less than 40	158	\$2,931,293	\$18,552
40 – 44	37	\$435,122	\$11,760
45 – 49	81	\$1,206,471	\$14,895
50 – 54	441	\$8,631,170	\$19,572
55 – 59	5,998	\$233,205,044	\$38,880
60 – 64	10,156	\$402,319,035	\$39,614
65 – 69	7,903	\$266,919,284	\$33,774
70 – 74	6,775	\$196,123,566	\$28,948
75 – 79	5,576	\$131,832,659	\$23,643
80 – 84	3,665	\$70,609,252	\$19,266
85 – 89	2,130	\$34,081,201	\$16,001
90+	1,532	\$22,705,603	\$14,821
Totals	44,452	\$1,370,999,700	\$30,842

7. VALUATION COST METHODS

PART A | ACTUARIAL COST METHOD

The Actuarial Cost Method which was used to determine pension liabilities in this valuation is known as the *Entry Age Normal Cost Method*. Under this method the *Normal Cost* for each active member on the valuation date is determined as the level percent of salary, which, if paid annually from the date the employee first became a member of the retirement system, would fully fund by retirement, death, disability or termination, the projected benefits which the member is expected to receive. The *Actuarial Liability* for each member is determined as the present value as of the valuation date of all projected benefits which the member is expected to receive, minus the present value of future annual Normal Cost payments expected to be made to the fund. Since only active members have a Normal Cost, the Actuarial Liability for inactives, retirees and survivors is simply equal to the present value of all projected benefits. The sum of Normal Cost and Actuarial Liability for each member is equal to the Normal Cost and Actuarial Liability for the Plan. The *Unfunded Actuarial Liability* is the Actuarial Liability less current assets.

The Normal Cost for a member will remain a level percent of salary for each year of membership except for changes in provisions of the Plan or the actuarial assumptions employed in projection of benefits and present value determinations. The Normal Cost for the entire system will also change due to the addition of new members or the retirement, death or termination of members. The Actuarial Liability for a member will increase each year to reflect the additional accrual of Normal Cost. It will also change if the Plan provisions or actuarial assumptions are changed.

Differences each year between the actual experience of the Plan and the experience projected by the actuarial assumptions are reflected by adjustments to the Unfunded Actuarial Liability. An experience difference which increases the Unfunded Actuarial Liability is called an *Actuarial Loss* and one which decreases the Unfunded Actuarial Liability is called an *Actuarial Gain*.

PART B | ASSET VALUATION METHOD

The actuarial value of assets is determined in accordance with the deferred recognition method under which 20% of the gains or losses occurring in the prior year are recognized, 40% of those occurring 2 years ago, etc., so that 100% of gains and losses occurring 5 years ago are recognized. The actuarial value of assets will be adjusted, if necessary, in order to remain between 85% and 115% of market value.

In valuations prior to 1998, plan assets were determined at market value. As part of the 1998 valuation, this methodology was adjusted to reduce the potential volatility in the market value approach from year to year. The actuarial value of assets as of January 1, 2006 is approximately 93.4% of the market value.

8. ACTUARIAL ASSUMPTIONS

INVESTMENT RETURN 8.25% per year

INTEREST RATE CREDITED TO
THE ANNUITY SAVINGS FUND 3.5% per year

COST OF LIVING
INCREASES (COLA) 3% per year

MORTALITY RP-2000 Healthy Annuitant table projected 10 years with scale AA (gender distinct). This is applicable to both pre-retirement and post-retirement benefits. For disabled members, the mortality rate is assumed to be in accordance with the RP-2000 Table (gender distinct) set forward 3 years for males. It is assumed that 55% of pre-retirement deaths are job-related. For members retired under an Accidental Disability, 40% of deaths are assumed to be from the same cause as the disability.

SALARY INCREASE Based on an analysis of past experience. Annual rates are shown below.

<u>Service</u>	
0	9.50%
1	8.50%
2	8.00%
3	7.50%
4	7.00%
5	6.75%
6	6.50%
7	6.25%
8	6.00%
9	5.75%
10	5.50%
11	5.50%
12	5.25%
13	5.25%
14-24	5.00%
25+	4.75%

8. ACTUARIAL ASSUMPTIONS *(continued)*

RETIREMENT

Age	Male Teachers		Female Teachers	
	Service		Service	
	<20	20+	<20	20+
45	0.00	0.00	0.00	0.00
46	0.00	0.00	0.00	0.00
47	0.00	0.00	0.00	0.00
48	0.00	0.00	0.00	0.00
49	0.00	0.00	0.00	0.00
50	0.00	0.01	0.00	0.01
51	0.00	0.01	0.00	0.01
52	0.00	0.01	0.00	0.01
53	0.00	0.01	0.00	0.01
54	0.00	0.02	0.00	0.01
55	0.02	0.03	0.02	0.04
56	0.04	0.03	0.04	0.04
57	0.07	0.05	0.07	0.05
58	0.08	0.07	0.08	0.07
59	0.09	0.10	0.09	0.11
60	0.12	0.20	0.12	0.16
61	0.15	0.30	0.15	0.20
62	0.18	0.35	0.18	0.25
63	0.15	0.35	0.15	0.25
64	0.25	0.30	0.25	0.30
65	0.40	0.50	0.40	0.40
66	0.40	0.30	0.40	0.30
67	0.40	0.30	0.40	0.25
68	0.40	0.30	0.40	0.35
69	0.40	0.40	0.40	0.35
70	1.00	1.00	1.00	1.00

Teachers electing the increased benefit under Chapter 114 of the Acts of 2000 were assumed to have higher rates of retirement from ages 54 to 62 if their service was greater than 30 years. These rates are the same for males and females. The rate at age 54 is 0.035. The rate increases to 0.06 at age 55, 0.18 at age 56, and 0.30 at age 57. The rate for ages 58, 59, and 62 is 0.40. The rate for ages 60 and 61 is 0.35.

8. ACTUARIAL ASSUMPTIONS *(continued)*

DISABILITY Based on an analysis of past experience. Sample annual rates are shown below.

Age	
20	0.00004
30	0.00006
40	0.00010
50	0.00050
60	0.00100

It is also assumed that 35% of disabilities will be job-related for Teachers.

WITHDRAWAL

Based on an analysis of past experience. In addition to being age and service based, Teacher rates are also gender based. Sample annual rates are shown below.

Age	Service		0		5		10+	
	Male	Female	Male	Female	Male	Female	Male	Female
20	0.090	0.060	0.040	0.090	0.010	0.040		
30	0.108	0.116	0.043	0.090	0.010	0.040		
40	0.093	0.114	0.049	0.070	0.015	0.031		
50	0.059	0.068	0.042	0.045	0.019	0.019		

9. SUMMARY OF PLAN PROVISIONS

ADMINISTRATION

There are 106 contributory Retirement Systems for public employees in Massachusetts. Each system is governed by a retirement board and all boards, although operating independently, are governed by Chapter 32 of the Massachusetts General Laws. This law establishes benefits, contribution requirements and an accounting and funds structure for all systems.

MEMBERSHIP

Membership is mandatory for nearly all full-time employees. Eligibility with respect to part-time, provisional, temporary, seasonal or intermittent employment is governed by regulations promulgated by each retirement board, and approved by PERAC. There are 4 classes of membership in the Commonwealth. Members of the Massachusetts Teachers' System are classified in Group 1.

Group 1:

General employees, including clerical, administrative, technical and all other employees not otherwise classified.

Group 2:

Certain specified hazardous duty positions.

Group 3:

State police officers and inspectors

Group 4:

Police officers, firefighters, corrections officers, and other specified hazardous positions.

MEMBER CONTRIBUTIONS

Member contributions vary depending on the most recent date of membership:

Prior to 1975:	5% of regular compensation
1975 - 1983:	7% of regular compensation
1984 to 6/30/96:	8% of regular compensation
7/1/96 to present:	9% of regular compensation
7/1/96 to present:	12% of regular compensation (State Police)
7/1/01 to present:	11% of regular compensation (for teachers hired after 7/1/01 and those accepting provisions of Chapter 114 of the Acts of 2000)
1979 to present:	an additional 2% of regular compensation in excess of \$30,000.

RATE OF INTEREST

Interest on regular deductions made after January 1, 1984 is a rate established by PERAC in consultation with the Commissioner of Banks. The rate is obtained from the average

9. SUMMARY OF PLAN PROVISIONS (*continued*)

rates paid on individual savings accounts by a representative sample of at least 10 financial institutions.

RETIREMENT AGE

There is no mandatory retirement age for employees in Groups 1 and 2. Most Group 4 members must retire at age 65. The mandatory retirement age for Group 3 members is 55, however, a Federal court order has enjoined the State Police from retiring any members on account of age.

SUPERANNUATION RETIREMENT

A member is eligible for a superannuation retirement allowance (service retirement) upon meeting the following conditions:

- completion of 20 years of service, or
- attainment of age 55 if hired prior to 1978, or if classified in Group 4, or
- attainment of age 55 with 10 years of service, if hired after 1978, and if classified in Group 1 or 2

AMOUNT OF BENEFIT

A member's annual allowance is determined by multiplying the member's average salary by a benefit rate related to the member's age and job classification at retirement, and the resulting product by his creditable service. The amount determined by the benefit formula cannot exceed 80% of the average salary. For veterans as defined in G.L. c. 32, s. 1, there is an additional benefit of \$15 per year for each year of creditable service, up to a maximum of \$300.

- Salary is defined as gross regular compensation.
- Average Salary is the average annual rate of regular compensation received during the 3 consecutive years that produce the highest average, or, if greater, during the last three years (whether or not consecutive) preceding retirement.
- The Benefit Rate varies with the member's retirement age, but the highest rate of 2.5% applies to Group 1 employees who retire at or after age 65, Group 2 employees who retire at or after age 60, and to Group 4 employees who retire at or after age 55. A .1% reduction is applied for each year of age under the maximum age for the member's group. For Group 2 employees who terminate from service under age 55, the benefit rate for a Group 1 employee shall be used.
- For a teacher who is subject to the provisions of Chapter 114 of the Acts of 2000 and who has completed at least 30 years of creditable service, the benefit rate is multiplied by the creditable service and the resulting percentage is increased by 2% per year for

9. SUMMARY OF PLAN PROVISIONS *(continued)*

each year of service in excess of 24. The amount determined cannot exceed 80% of the average salary.

- For Group 3 members, the rate is 3% for any age.

DEFERRED VESTED BENEFIT

A participant who has completed 10 or more years of creditable service is eligible for a deferred vested retirement benefit. Elected officials and others who were hired prior to 1978 may be vested after 6 years in accordance with G.L. c. 32, s. 10.

The participant's accrued benefit is payable commencing at age 55, or the completion of 20 years, or may be deferred until later at the participant's option.

WITHDRAWAL OF CONTRIBUTIONS

Member contributions may be withdrawn upon termination of employment. Employees who first become members on or after January 1, 1984, may receive only limited interest on their contributions if they voluntarily terminate their service. Those who leave service with less than 5 years receive no interest; those who leave service with greater than 5 but less than 10 years receive 50% of the interest credited.

ORDINARY DISABILITY

Eligibility: Non-veterans who become totally and permanently disabled by reason of a non-job related condition with at least 10 years of creditable service (or 15 years creditable service in systems in which the local option contained in G.L. c. 32, s.6(1) has not been adopted).

Veterans with ten years of creditable service who become totally and permanently disabled by reason of a non-job related condition prior to reaching "maximum age".

Retirement Allowance: Equal to the accrued superannuation retirement benefit as if the member was age 55. If the member is a veteran, the benefit is 50% of the member's final rate of salary during the preceding 12 months, plus an annuity based upon accumulated member contributions plus credited interest. If the member is over age 55, he/she will receive an allowance that is not less than the allowance he/she would have received if retired for superannuation.

9. SUMMARY OF PLAN PROVISIONS *(continued)*

ACCIDENTAL DISABILITY

Eligibility: Applies to members who become permanently and totally unable to perform the essential duties of the position as a result of a personal injury sustained or hazard undergone while in the performance of duties. There are no minimum age or service requirements.

Retirement Allowance: 72% of salary plus an annuity based on accumulated member contributions, with interest. This amount is not to exceed 100% of pay. However, for those who became members in service after January 1, 1988 or who have not been members in service continually since that date, the amount is limited to 75% of pay. There is an additional pension of \$576.24 per year (or \$312.00 per year in systems in which the local option contained in G.L. c. 32, s.7(2)(a)(iii) has not been adopted), per child who is under 18 at the time of the member's retirement, with no age limitation if the child is mentally or physically incapacitated from earning. The additional pension may continue up to age 21 for any child who is a full time student at an accredited educational institution.

ACCIDENTAL DEATH

Eligibility: Applies to members who die as a result of a work-related injury or if the member was retired for accidental disability and the death was the natural and proximate result of the injury or hazard undergone on account of which such member was retired.

Allowance: An immediate payment to a named beneficiary equal to the accumulated deductions at the time of death, plus a pension equal to 72% of current salary and payable to the surviving spouse, dependent children or the dependent parent, plus a supplement of \$312 per year, per child, payable to the spouse or legal guardian until all dependent children reach age 18 or 21 if a full time student, unless mentally or physically incapacitated.

The surviving spouse of a member of a police or fire department or any corrections officer who, under specific and limited circumstances detailed in the statute, suffers an accident and is killed or sustains injuries resulting in his death, may receive a pension equal to the maximum salary for the position held by the member upon his death.

In addition, an eligible family member of a firefighter, public prosecutor, police officer or corrections officer killed in the line of duty may receive a one time payment of \$100,000 from the State Retirement Board.

9. SUMMARY OF PLAN PROVISIONS *(continued)*

DEATH AFTER ACCIDENTAL DISABILITY RETIREMENT

Effective November 7, 1996, Accidental Disability retirees were allowed to select Option C at retirement and provide a benefit for an eligible survivor. For Accidental Disability retirees prior to November 7, 1996, who could not select Option C, if the member's death is from a cause unrelated to the condition for which the member received accidental disability benefits, a surviving spouse will receive an annual allowance of \$6,000.

DEATH IN ACTIVE SERVICE

Eligibility: At least 2 years of service

Allowance: An immediate allowance equal to that which would have been payable had the member retired and elected Option C on the day before his or her death. For death occurring prior to the member's superannuation retirement age, the age 55 benefit rate is used. The minimum annual allowance payable to the surviving spouse of a member-in-service who dies with at least two years of creditable service is \$3,000, provided that the member and the spouse were married for at least one year and living together on the member's date of death.

The surviving spouse of such a member-in-service receives an additional allowance equal to the sum of \$1,440 per year for the first child and \$1,080 per year for each additional child until all dependent children reach age 18 or 22 if full time students, unless mentally or physically incapacitated.

COST OF LIVING

Chapter 17 of the Acts of 1997 provides that the first \$12,000 of a retiree's total allowance is subject to an annual cost-of-living adjustment (COLA). Each year PERAC notifies the Massachusetts General Court of the percentage increase in the Consumer Price Index used for indexing Social Security benefits. This COLA is subject to an annual vote of the Massachusetts General Court, but cannot exceed 3.0%.

9. SUMMARY OF PLAN PROVISIONS *(continued)*

METHODS OF PAYMENT

A member may elect to receive his or her retirement allowance in one of 3 forms of payment.

Option A: Total annual allowance, payable in monthly installments, commencing at retirement and terminating at the member's death.

Option B: A reduced annual allowance, payable in monthly installments, commencing at retirement and terminating at the death of the member, provided, however, that if the total amount of the annuity portion received by the member is less than the amount of his or her accumulated deductions, including interest, the difference or balance of his accumulated deductions will be paid in a lump sum to the retiree's beneficiary or beneficiaries of choice.

Option C: A reduced annual allowance, payable in monthly installments, commencing at retirement. At the death of the retired employee, $\frac{2}{3}$ of the allowance is payable to the member's designated beneficiary (who may be the spouse, or former spouse who remains unmarried for a member whose retirement becomes effective on or after February 2, 1992, child, parent, sister, or brother of the employee) for the life of the beneficiary. For members who retired on or after January 12, 1988, if the beneficiary pre-deceases the retiree, the benefit payable increases (or "pops up") based on the factor used to determine the Option C benefit at retirement. For members who retired prior to January 12, 1988, if the System has accepted Section 288 of Chapter 194 of the Acts of 1998 and the beneficiary pre-deceases the retiree, the benefit payable "pops up" in the same fashion. The Option C became available to accidental disability retirees on November 7, 1996.

ALLOCATION OF PENSION COSTS

If a member's total creditable service was partly earned by employment in more than one retirement system, the cost of the "pension portion" is allocated between the different systems pro rata based on the member's service within each retirement system.

10. GLOSSARY OF TERMS

ACTUARIAL ACCRUED LIABILITY

That portion of the Actuarial Present Value of pension plan benefits which is not provided by future Normal Costs or employee contributions. It is the portion of the Actuarial Present Value attributable to service rendered as of the Valuation Date.

ACTUARIAL ASSUMPTIONS

Assumptions, based upon past experience or standard tables, used to predict the occurrence of future events affecting the amount and duration of pension benefits, such as: mortality, withdrawal, disablement and retirement; changes in compensation; rates of investment earnings and asset appreciation or depreciation; and any other relevant items.

ACTUARIAL COST METHOD (OR FUNDING METHOD)

A procedure for allocating the Actuarial Present Value of all past and future pension plan benefits to the Normal Cost and the Actuarial Accrued Liability.

ACTUARIAL GAIN OR LOSS (OR EXPERIENCE GAIN OR LOSS)

A measure of the difference between actual experience and that expected based upon the set of Actuarial Assumptions, during the period between two Actuarial Valuation dates.

Note: The effect on the Accrued Liability and/or the Normal Cost resulting from changes in the Actuarial Assumptions, the Actuarial Cost Method or pension plan provisions would be described as such, not as an Actuarial Gain (Loss).

ACTUARIAL PRESENT VALUE

The dollar value on the valuation date of all benefits expected to be paid to current members based upon the Actuarial Assumptions and the terms of the Plan.

AMORTIZATION PAYMENT

That portion of the pension plan appropriation which represents payments made to pay interest on and the reduction of the Unfunded Accrued Liability.

10. GLOSSARY OF TERMS *(continued)*

ANNUAL STATEMENT

The statement submitted to PERAC each year that describes the asset holdings and Fund balances as of December 31 and the transactions during the calendar year that affected the financial condition of the retirement system.

ANNUITY RESERVE FUND

The fund into which total accumulated deductions, including interest, is transferred at the time a member retires, and from which annuity payments are made.

ANNUITY SAVINGS FUND

The fund in which employee contributions plus interest credited are held for active members and for former members who have not withdrawn their contributions and are not yet receiving a benefit (inactive members).

ASSETS

The value of securities held by the plan.

COST OF BENEFITS

The estimated payment from the pension system for benefits for the fiscal year.

FUNDING SCHEDULE

The schedule based upon the most recently approved actuarial valuation which sets forth the amount which would be appropriated to the pension system in accordance with Section 22C of M.G.L. Chapter 32.

GASB

Governmental Accounting Standards Board

10. GLOSSARY OF TERMS *(continued)*

NORMAL COST

Total Normal Cost is that portion of the Actuarial Present Value of pension plan benefits, which is to be paid in a single fiscal year. The Employee Normal Cost is the amount of the expected employee contributions for the fiscal year. The Employer Normal Cost is the difference between the Total Normal Cost and the Employee Normal Cost.

PENSION FUND

The fund into which appropriation amounts as determined by PERAC are paid and from which pension benefits are paid.

PENSION RESERVE FUND

The fund which shall be credited with all amounts set aside by a system for the purpose of establishing a reserve to meet future pension liabilities. These amounts would include excess interest earnings.

SPECIAL FUND FOR MILITARY SERVICE CREDIT

The fund which is credited with amounts paid by the retirement board equal to the amount which would have been contributed by a member during a military leave of absence as if the member had remained in active service of the retirement board. In the event of retirement or a non-job related death, such amount is transferred to the Annuity Reserve Fund. In the event of termination prior to retirement or death, such amount shall be transferred to the Pension Fund.

UNFUNDED ACCRUED LIABILITY

The excess of the Actuarial Accrued Liability over the Assets.

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